

04
an alternate signal source adapted to provide an alternate signal from a second position relative to said instrument which includes a lower proportion of said unwanted signal; and
first and second signal processors adapted to receive said first and alternate signals, respectively, and adapted to adjust a level for a selected frequency band of said first signal and said alternate signal with said respective first and second processors, such that an increase of level in one of said first and alternate signals results in a decrease in level in the other of said first and alternate signals wherein one of said first and second signal processors is a high-pass filter and the other of said first and second signal processors is a low pass-filter.

REMARKS

Claims 1-32 remain in the application. Claims 33-35 have been canceled. Claims 6, 11, 12, 23 and 26 have been amended. The Applicants have elected, with traverse, claims 1-32 in response to a restriction requirement by the Examiner on October 25, 2000. Applicants preserve the right to file a divisional application for the unelected claims. In view of the amendments, claims 6-7, 12-18, 23 and 26-27 have been put into the form suggested by the Examiner and should now be allowed.

REJECTIONS UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

Claim 11 was rejected under 35 U.S.C. §112, second paragraph for failing to particularly point out and distinctly claim the present invention. In particular, the Office Action states that there is insufficient antecedent basis for the phrase "said gain" in line 1 of the claim. This claim has been amended by changing "said gain" to --a gain--. In view of the amendment, reconsideration and withdrawal of the rejection of claim 11 under 35 U.S.C. § 112, second

paragraph is respectfully requested.

REJECTIONS UNDER 35 U.S.C. §§ 102(b) AND 103(a)

Claims 1, 2, 5, 19, 20 and 22 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,932,063 to Nakamura ("Nakamura"). Claims 4, 8, 21, 24 and 30 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura. Claims 3 and 9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura in view of U.S. Patent No. 5,939,656 to Suda. Claims 10-11 and 25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura in view of U.S. Patent No. 4,201,107 to Barber, Jr. et al. ("Barber"). Claims 28 and 31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura in view of U.S. Patent No. 5,809,843 to Barger et al. ("Barger"). Claims 29 and 32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura in view of U.S. Patent No. 4,524,667 to Duncan ("Duncan"). These rejections are traversed because they do not teach or suggest the presently claimed invention.

The present invention concerns a method and apparatus for removing or reducing the effects of an unwanted signal on a desired signal. By way of example, if a musical band is playing near an air conditioning vent, the present invention provides a way to reduce the presence of the sound from the A.C. vent in the signal generated by the musical band. According to claim 1, a first signal is provided that includes the unwanted signal. This can be generated by placing a microphone near the A.C. vent in this example. An alternate signal is provided which includes a lower proportion of the unwanted signal (e.g., generated by a microphone placed ten feet in front of the musical band). Then, a level for a selected frequency band is adjusted in both signals such that an increase in level for one signal results in a decrease in level for the other signal. The two

signals are then combined. For example, the A.C. vent may be producing a signal that is in a given frequency range. The signal from the A.C. vent (a “first” signal) is modified by reducing the level of the given frequency range, while the same frequency range of the alternate signal is increased. The combined signal will sound better in this example, because the effect of the unwanted signal has been reduced in the combined signal.

Nakamura neither shows nor suggests all of the steps of claim 1. The circuit and method described at Col. 3, line 45 to Col. 4, line 32 provide a complex phase shifting system to reduce noise in a signal. According to Nakamura, the equations shown as (3) and (4) (Col. 4, lines 26-28), concern the calculation of two values D_{sf} and D_{nf} . These two values are based on I_{pif} and I_{rif} which are rectified and smoothed. As known in the art, an AC signal that has been rectified and smoothed resembles a DC signal. Accordingly, D_{sf} and D_{nf} are integer values, such that if the difference between these values is less than a threshold value, t_h , then the ratio $k_i(n)$ is renewed (see Col. 4, lines 30-32). Based on this it is unclear how equations 3 and 4 support the assertion in the Office Action, that “the increase in one signal amplitude results in the decrease of other signal’s amplitude, thereby meeting [claim] 1” In Nakamura, a signal I_p , which includes an audio signal $s(t)$ and a noise component $n(t)$, is input to a low-pass filter while another signal I_r , which is a noise component picked up by a sensor is input to a separate low-pass filter. The I_r signal includes a phase difference t_d and an amplitude ratio, k . The outputs of the low pass filters are input to bank of band-pass filters. Each signal goes through each of the filters and the resulting signals (now I_{pi} and I_{ri}) are sent to phase difference detecting and correcting circuit 11, which shifts the I_{ri} signal with respect to the I_{pi} signal. In amplitude difference detecting and correcting circuit 12, an output signal is generated (apparently through some adjustment of the I_{pi} signal since the output signal is characterized as $s(f)$).

Claim 1 recites that the signal processors increase the signal level of a selected frequency band of one signal which results in a decrease in the signal level of the selected frequency band in the other signal. At least this feature of claim 1 is not shown in Nakamura. In Nakamura, it would appear that the Ip and Ir signals are processed independently through the low pass filters 3, 4, and bandpass filter bank 5. One or both of the signals are phase shifted in element 11. The resulting signals are processed in element 12 to produce an output signal. There is no description in Nakamura that in element 11 or in element 12 the signal level of a selected frequency band is increased for one of the Ir or Ip signals while the signal level of a selected frequency band is decreased for the other signal.

Independent claims 5, 8, 19, 22, 24, and 30 include similar limitations on the adjusting of signal levels in first and alternate signals. For at least the reasons given above, these claims are also believed to be allowable. As to the remaining dependent claims (claims 2-4, 9-11, 20-21, 24-25, 28-29, and 31-32), these claims depend from and further define the independent claims and are also believed to be allowable for at least the same reason.

It appears from the Office Action that the remaining references are not cited to show this feature, but were instead intended to show features in several of the dependent claims.

Applicants believe that at least a basic feature of each of the claims is not shown in the Nakamura reference or any of the other cited references. Though not discussed in detail, herein, Applicants also contend that other features of the independent claims and dependent claims are not shown or suggested in the cited references. For the reasons given above, reconsideration and withdrawal of the rejection of claims 1-5, 8-11, 19-22, 24-25, and 28-32 under 35 U.S.C. §§ 102(b) and 103(a) is respectfully requested.

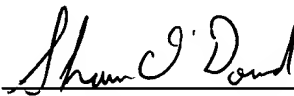
CONCLUSION

For all the above reasons, the Applicants respectfully submit that this application is in condition for allowance. A Notice of Allowance is earnestly solicited.

The Examiner is invited to contact the undersigned at (408) 975-7500 to discuss any matter concerning this application. The Office is hereby authorized to charge any additional fees or credit any overpayments under 37 C.F.R. § 1.16 or § 1.17 to Deposit Account No. 11-0600.

Respectfully submitted,
KENYON & KENYON

Dated: 3/9/01

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